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10/028,305	12/28/2001	Gee Sung Chae	2658-0283P	2901

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EXAMINER	
RUDE, TIMOTHY L	

ART UNIT	PAPER NUMBER
2883	

DATE MAILED: 12/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/028,305	SUNG CHAE ET AL.	
	Examiner	Art Unit	
	Timothy L. Rude	2883	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 September 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15 and 21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15 and 21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claims

Claims 1 and 8 are amended. Claim 21 is added.

Claim Objections

Claims 1, 8, and 21 are objected to because of the following informalities:

Claim 1 is drawn to a liquid crystal display device, and as such, may not have limitations drawn to an intermediate step of production. Device claims must read on the completed device, not intermediate stages of manufacture. For examination purposes, the limitations drawn to intermediate steps will be considered met by the structural limitations of the completed device.

Claims 8 and 21 are drawn to method step specificity (newly defined species) that does not have adequate support in the original disclosure. For examination purposes the limitations as to using the electrodes as a mask will be considered met by patterning in the same pattern.

Appropriate corrections are required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 8, and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Ueda et al (Ueda) USPAT 6,078,365.

As to claim 1, Ueda discloses an embodiment in Figures 15A-15F (col. 12, line 58, through col. 18, line 33, especially col. 16, line 64, through col. 18, line 33) comprising: a substrate, 71; a gate electrode, G, over the substrate; a first semiconductor layer, 77, over the gate electrode; a second semiconductor layer, 78, over the first semiconductor layer and having a defined outer edge, source, S, and drain, D, electrodes (Applicant's first metal layer) on the second semiconductor layer, the first metal layer patterned in a same pattern as the second semiconductor layer such that the first metal layer and second semiconductor layer define the channel (Applicant's separation region). Please note that this is by way of only one photolithography pattern per Figures (Applicant's patterned in the same pattern).

Ueda further discloses the use of source, S, and drain, D, comprised of Aluminum and Molybdenum disposed on Molybdenum (Mo/Al/Mo) (comprises Applicant's electrodes over the first metal layer), the source and drain electrodes patterned the same as the first metal layer and having a defined outer edge and the

second semiconductor layer (col. 17, lines 22-42) define first upper portion of the separation region, and the source and drain electrodes include a second (Al) and a third (Mo) metal layer, in order to use a low resistance metal such as Aluminum for improved conductivity of the circuit components (col. 17, line 55, through col. 18, line 5).

The outer defined edges of the metal layers and silicon layers are all lined up and abut each other to define the channel as illustrated.

FIG. 15A

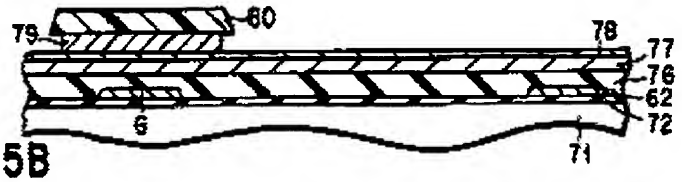
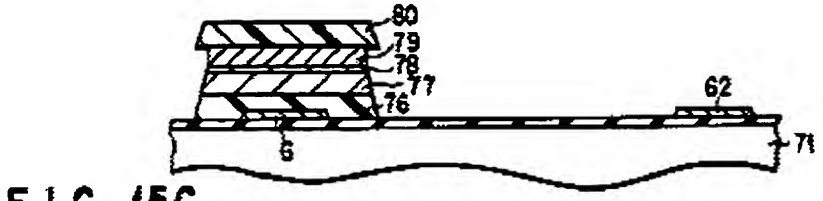
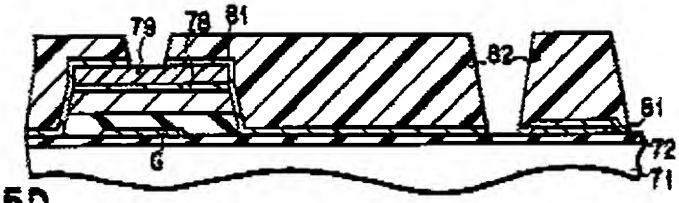


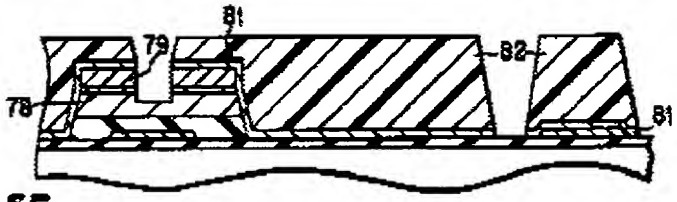
FIG. 15B



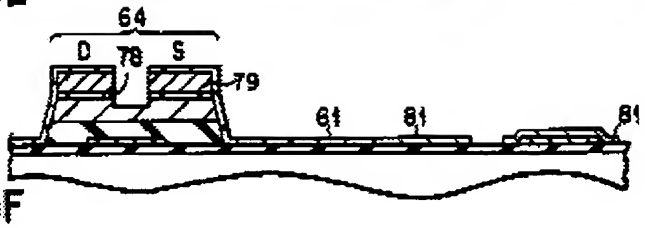
F I G. 15C



F I G. 15D



F I G. 15E



F I G. 15F

As to claims 8 and 21, Ueda discloses (col. 12, line 58, through col. 18, line 33, especially col. 16, line 64, through col. 18, line 33) the method of forming a liquid crystal display device, comprising: forming a gate electrode on a substrate; forming an active layer over the gate electrode; forming a first semiconductor layer over the active layer; forming a second semiconductor layer over the first semiconductor layer; forming a first metal layer over the second semiconductor layer patterning the first metal layer and the second semiconductor layer in a same pattern; and forming a source electrode and a drain electrode over the first metal layer.

The outer defined edges of the metal layers and silicon layers are all lined up and abut each other to define the channel as illustrated.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art (APA) in view of Ueda et al (Ueda) USPAT 6,078,365.

As to claim 1, APA discloses a conventional liquid crystal display device in Figures 1-5 (Specification pages 1-5), comprising: a substrate, 1; a gate electrode, 3, over the substrate; a first semiconductor layer, 15, over the gate electrode; a second semiconductor layer, 17, over the first semiconductor layer, source, 5, and drain, 7, electrodes (Applicant's first metal layer) on the second semiconductor layer, the first metal layer patterned in a same pattern as the second semiconductor layer such that the first metal layer and second semiconductor layer define the channel, 30 (Applicant's separation region) per Figure 3C (specification page 3, lines 28-31). Please note that this is well known in the art to take only one photolithography pattern (Applicant's patterned in the same pattern).

APA does not explicitly disclose source and drain electrodes over the first metal layer, the source and drain electrodes patterned the same as the first metal layer and the second semiconductor layer define first upper portion of the separation region, and the source and drain electrodes include a second and a third metal layer.

Ueda teaches and embodiment in Figures 15A-15F (col. 12, line 58, through col. 18, line 33, especially col. 16, line 64, through col. 18, line 33) the use of source, S, and drain, D, comprised of Aluminum and Molybdenum disposed on Molybdenum (Mo/Al/Mo) (comprises Applicant's electrodes over the first metal layer), the source and drain electrodes patterned the same as the first metal layer and the second semiconductor layer (col. 17, lines 22-42) define first upper portion of the separation region, and the source and drain electrodes include a second (Al) and a third (Mo) metal

layer, in order to use a low resistance metal such as Aluminum for improved conductivity of the circuit components (col. 17, line 55, through col. 18, line 5).

Ueda is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add source and drain electrodes over the first metal layer, the source and drain electrodes patterned the same as the first metal layer and the second semiconductor layer define first upper portion of the separation region, and the source and drain electrodes include a second and a third metal layer in order to use a low resistance metal such as Aluminum for improved conductivity of the circuit components.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of APA with added source and drain electrodes over the first metal layer, the source and drain electrodes patterned the same as the first metal layer and the second semiconductor layer define first upper portion of the separation region, and the source and drain electrodes include a second and a third metal layer in order to use a low resistance metal such as Aluminum for improved conductivity of the circuit components.

As to claim 8, the method of forming a liquid crystal display device, comprising: forming a gate electrode on a substrate; forming an active layer over the gate electrode; forming a first semiconductor layer over the active layer; forming a second semiconductor layer over the first semiconductor layer; forming a first metal layer over the second semiconductor layer patterning the first metal layer and the second

semiconductor layer in a same pattern; and forming a source electrode and a drain electrode over the first metal layer, would have been obvious given the device structure above and the teachings of Ueda (col. 12, line 58, through col. 18, line 33, especially col. 16, line 64, through col. 18, line 33).

As to claim 2, APA discloses a device, further comprising: an insulating layer in between the gate electrode and the first semiconductor layer; a protective layer, 21, over the source and drain electrodes and defining a second upper portion of the separation region (Figure 3D) and a contact hole, 19b, exposing a portion of the drain electrode; and a pixel electrode, 23, in the contact hole (Figure 3E).

As to claim 3, APA in view of Ueda, as combined above, discloses the device of claim 1 above, wherein; the second metal layer includes aluminum (Al, Ueda, col. 17, lines 22-30).

As to claim 4, APA in view of Ueda, as combined above, discloses the device of claim 1 above, wherein the first and third metal layers are formed of the same material (Mo, Ueda, col. 17, lines 22-30).

As to claim 5, APA in view of Ueda, as combined above, discloses the device of claim 1 above.

The device of claim 1 above does not explicitly disclose a device wherein the first and third metal layers are formed of different materials.

Ueda teaches the use of a refractory metal of Cr or a Mo-Ta alloy (col. 12, lines 62-67) as art recognized equivalents suitable for the intended purpose of forming an undercoat conductive layer (MPEP 2144.07).

Ueda is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use Cr or a Mo-Ta alloy for one of the first or third metal layers, resulting in the claimed device wherein the first and third metal layers are formed of different materials.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of APA in view of Ueda with the Cr or a Mo-Ta alloy for one of the first or third metal layers, resulting in the claimed device wherein the first and third metal layers are formed of different materials.

As to claim 6, APA in view of Ueda, as combined above, discloses the device of claim 1 above, wherein the first and third metal layers include molybdenum (Mo, Ueda, col. 17, lines 22-30).

As to claim 7, APA in view of Ueda, as combined above, discloses the device of claim 4 above, wherein the first and third metal layers are formed include molybdenum (Mo, Ueda, col. 17, lines 22-30).

As to claim 9, the method of claim 8, wherein forming the source and drain electrodes includes forming a second metal layer over the first metal layer, forming a third metal layer over the first metal layer, and patterning the second and third metal layers in the same pattern is the first metal layer and second semiconductor layer in the channel region so that a channel portion of the first semiconductor layer is exposed, would have been obvious given the device structure above.

As to claim 10, APA in view of Ueda, as combined above, discloses the method of claim 8 above, wherein the first and third metal layers include molybdenum (Mo, Ueda, col. 17, lines 22-30).

As to claim 11, APA in view of Ueda, as combined above, discloses the method of claim 9 above, wherein the first and third metal layers are formed of the same material (Mo, Ueda, col. 17, lines 22-30).

As to claim 12, APA in view of Ueda, as combined above, discloses the method of claim 9 above.

The method of claim 9 above does not explicitly disclose a device wherein the first and third metal layers are formed of different materials.

Ueda teaches the use of a refractory metal of Cr or a Mo-Ta alloy (col. 12, lines 62-67) as art recognized equivalents suitable for the intended purpose of forming an undercoat conductive layer (MPEP 2144.07).

Ueda is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use Cr or a Mo-Ta alloy for one of the first or third metal layers, resulting in the claimed method wherein the first and third metal layers are formed of different materials.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of APA in view of Ueda with the Cr or a Mo-Ta alloy for one of the first or third metal layers, resulting in the claimed method wherein the first and third metal layers are formed of different materials.

As to claim 13, APA in view of Ueda, as combined above, discloses the method of claim 9 above, wherein; the second metal layer includes aluminum (Al, Ueda, col. 17, lines 22-30).

As to claim 14, APA in view of Ueda, as combined above, discloses the method of claim 9 above, wherein the first and third metal layers include molybdenum (Mo, Ueda, col. 17, lines 22-30).

As to claim 15, APA in view of Ueda, as combined above, discloses the method of claim 8 above, wherein the patterning of the first metal layer and second semiconductor layer define channel region includes removing a portion of the first metal layer and second metal layer corresponding to the gate electrode and exposing the first semiconductor layer (Figure 15F, and col. 17, lines 14-67).

Response to Arguments

Applicant's arguments filed on 09 September 2005 have been fully considered but they are not persuasive since they are dependent upon claim amendments objected to above.

Applicant's ONLY arguments are as follows:

(1) Prior art does not teach patterning by using the electrodes as a mask.

(2) Dependent claims are allowable because base claims are allowable.

Examiner's responses to Applicant's ONLY arguments are as follows:

(1) Claim 1 is drawn to a liquid crystal display device, and as such, may not have limitations drawn to an intermediate step of production. Device claims must read on the completed device, not intermediate stages of manufacture. For examination purposes, the limitations drawn to intermediate steps will be considered met by the structural limitations of the completed device. Claims 8 and 21 are drawn to method step

specificity (newly defined species) that does not have adequate support in the original disclosure. For examination purposes the limitations as to using the electrodes as a mask will be considered met by patterning in the same pattern.

(2) It is respectfully pointed out that in so far as Applicant has not argued rejection(s) of the limitations of dependent claim(s), Applicant has acquiesced said rejection(s).

References cited but not applied are relevant to the instant Application. Examiner recommends Applicant review the newly cited references.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy L. Rude whose telephone number is (571) 272-2301. The examiner can normally be reached on Mon-Thurs.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Timothy L Rude
Examiner
Art Unit 2883

tlr

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